

CLAIMS

1. A photodetector including a photosensitive region where pixels are arranged two-dimensionally;

one pixel being constructed by arranging a plurality of photosensitive portions outputting respective electric currents corresponding to incident light intensities adjacent to each other within a single plane;

one set of the photosensitive portions in a plurality of photosensitive portions constituting a plurality of pixels arranged in a first direction in the two-dimensional arrangement being electrically connected to each other;

the other set of the photosensitive portions in a plurality of photosensitive portions constituting a plurality of pixels arranged in a second direction in the two-dimensional arrangement being electrically connected to each other;

the photodetector comprising:

first integrating circuits, provided so as to correspond to one group of photosensitive portions electrically connected to each other in the plurality of pixels arranged in the first direction, for converting corresponding electric currents from the one group of photosensitive portions into voltages and outputting the voltages;

a first maximum value detecting circuit for detecting a maximum value of the respective voltages outputted from the first integrating circuits;

a first A/D converter circuit for converting the respective voltages outputted from the first integrating circuits into digital values

within an A/D conversion range from the maximum value detected by the first maximum value detecting circuit to a value smaller than the maximum value by a predetermined value and outputting the digital values;

5 second integrating circuits, provided so as to correspond to the other group of photosensitive portions electrically connected to each other in the plurality of pixels arranged in the second direction, for converting corresponding electric currents from the other group of photosensitive portions into voltages and outputting the voltages;

10 a second maximum value detecting circuit for detecting a maximum value of the respective voltages outputted from the second integrating circuits; and

 a second A/D converter circuit for converting the respective voltages outputted from the second integrating circuits into digital values within an A/D conversion range from the maximum value detected by the second maximum value detecting circuit to a value smaller than the maximum value by a predetermined value and outputting the digital values.

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2. A photodetector according to claim 1, further comprising:

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 a first level shift circuit for determining a voltage by subtracting a predetermined value from the maximum value detected by the first maximum value detecting circuit, subtracting thus determined voltage from the respective voltages outputted from the first integrating circuits, and outputting the resulting outputs to the first A/D converter circuit;

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and

a second level shift circuit for determining a voltage by subtracting a predetermined value from the maximum value detected by the second maximum value detecting circuit, subtracting thus determined voltage from the respective voltages outputted from the second integrating circuits, and outputting the resulting outputs to the second A/D converter circuit.

3. A photodetector including a photosensitive region where pixels are arranged two-dimensionally;

one pixel being constructed by arranging a plurality of photosensitive portions outputting respective electric currents corresponding to incident light intensities adjacent to each other within a single plane;

one set of the photosensitive portions in a plurality of photosensitive portions constituting a plurality of pixels arranged in a first direction in the two-dimensional arrangement being electrically connected to each other;

the other set of the photosensitive portions in a plurality of photosensitive portions constituting a plurality of pixels arranged in a second direction in the two-dimensional arrangement being electrically connected to each other;

the photodetector comprising:

first integrating circuits, provided so as to correspond to one group of photosensitive portions electrically connected to each other in the plurality of pixels arranged in the first direction, for converting corresponding electric currents from the one group of photosensitive portions into voltages and outputting the voltages;

a first minimum value detecting circuit for detecting a minimum value of the respective voltages outputted from the first integrating circuits;

5 a first A/D converter circuit for converting the respective voltages outputted from the first integrating circuits into digital values within an A/D conversion range from the minimum value detected by the first minimum value detecting circuit to a value greater than the minimum value by a predetermined value and outputting the digital values;

10 second integrating circuits, provided so as to correspond to the other group of photosensitive portions electrically connected to each other in the plurality of pixels arranged in the second direction, for converting corresponding electric currents from the other group of photosensitive portions into voltages and outputting the voltages;

15 a second minimum value detecting circuit for detecting a minimum value of respective voltages outputted from the second integrating circuits; and

20 a second A/D converter circuit for converting the respective voltages outputted from the second integrating circuits into digital values within an A/D conversion range from the minimum value detected by the second maximum value detecting circuit to a value greater than the minimum value by a predetermined value and outputting the digital values.

25 4. A photodetector according to claim 1 or 3, wherein the photodetector is used together with a light source for irradiating an object with light, and arithmetically operates information concerning the

light emitted from the light source.

5. A photodetector according to claim 4, wherein the information concerning the light is a luminous profile of reflected light of the light emitted from the light source in the first and second directions in the two-dimensional arrangement.

6. A photodetector according to claim 4, wherein the information concerning the light is a luminous profile of direct light of the light emitted from the light source in the first and second directions in the two-dimensional arrangement.